

REMARKS

Claim Rejections under 35 U.S.C. § 102(e)

Reconsideration of the rejection of claims 1-11, 13-17, 24, 25, 29-32, and 38-40 under 35 U.S.C. § 102(e) as being anticipated by Liess et al. (U.S. Patent No. 6,707,027) is respectfully requested.

Claim 1

Reconsideration of the rejection of claim 1 under 35 U.S.C. § 102(e) as being anticipated by Liess et al. is respectfully requested.

Claim 1 is directed to a data input device for use with a tracking surface having light-scattering properties, said device comprising:

a single laser having a cavity from which a light beam is projected, said laser being configured to project the light beam onto said tracking surface, at least a portion of the light beam striking said tracking surface reflecting back into the cavity of said laser and thereby altering at least one characteristic of the projected light beam;

a detector associated with the laser for detecting said altered characteristic of the light beam projected by the laser; and

a controller responsive to the detector for determining the relative distance between said device and said tracking surface as a function of the altered characteristic of the projected light beam detected by the detector.¹

None of the references, taken individually or in combination, discloses or suggests these novel elements.

As discussed in the previous Office action response, none of the references discloses a data input device having **a controller responsive to the detector for determining the relative distance between the device and the tracking surface** as a function of the altered characteristic of the projected light beam detected by the detector. Applicants' disclosure explains the importance of the controller for determining the relative distance between the device and the tracking surface. For example, the controller may compare the relative distance between the device and the tracking surface to a lift-off detection distance. The controller may then alter the data output of the data input device as a function of the comparison. More specifically, the

controller can suspend tracking of relative movement between the device and the tracking surface when the device is spatially separated from the tracking surface by at least the lift-off detection distance; or conversely, the controller can maintain tracking of relative movement between the device and the tracking surface when the device is spatially separated from the tracking surface by less than the lift-off detection distance. Again, none of the references discloses such a device with a controller for determining the relative distance between the device and the tracking surface. Without a teaching for such a controller, Liess et al. cannot anticipate claim 1.

To anticipate a claim, each and every element of the claim must be found, either expressly or inherently described, in a single prior art reference.² Without teaching each element, Liess et al. cannot anticipate claim 1. Here, Liess et al. fails to teach a controller **for determining the relative distance between the device and the tracking surface** as defined by claim 1. In particular, Liess et al. do disclose detecting that movement in the z-direction has occurred. But Liess et al. provide no teaching or suggestion for **quantifying** such movement. In fact, Liess et al. explicitly teach that **quantifying such movement accurately is “not necessary.”** Liess et al. state that

In applications wherein the movement of a human finger in the Z direction and the input device relative to each other is used to perform a click function, **it suffices to detect that such a movement takes place. An accurate measuring of the displacement of the object is not necessary so that the Z-measurement may be rather rough.** Even the direction of the movement need not be detected.³

Thus, Liess et al. teach that any effort to quantify the movement beyond merely noting that there was some movement is unnecessary. This teaching is not anticipatory. One skilled in the art would not look to Liess et al. for any teaching regarding determination of the relative distance because Liess et al. explicitly state that there is no need to make such a determination. With such an explicit disclaimer of the relevance of this feature of claim 1, Liess et al. cannot be said to anticipate claim 1.

In the final Office action, the Office argues that Liess et al. do teach determining the relative distance between the device and the tracking surface where Liess et al. state that “an accurate measuring of the displacement of the object is not necessary so that the Z-measurement

¹ (emphasis added).

² M.P.E.P. § 2131.

³ U.S. Patent No. 6,707,027, column 12, lines 50-56 (emphasis added).

may be rather rough.” The Office disputes Applicants’ statement that Liess et al. explicitly state that there is no need to make such a determination of distance. Applicants again refer to the teaching of Liess et al. in its entirety, which clearly shows that Liess et al. do not teach or suggest quantifying the movement beyond merely noting that some movement occurred. The entire portion of Liess et al. referred to by the Office and Applicants is reproduced here:

The values of the velocities and, by integration with respect to time duration of movement, the **distance of the movement in the X and Y directions obtained in this way are more reliable and accurate**, because they are the result of averaging the output signals of at least two photo diodes. Movement errors, or unwanted movements, such as slightly lifting the finger, have a similar effect on the output signals of the photo-diodes. As the movements along the X and Y measuring axes are determined by subtracting output signals from each other, the influence of an unwanted movement on the X- and Y measuring signal is eliminated. **Only the Z-measuring signal, V_z , which is obtained by adding the output signals of the three photo diodes is indicative of an up/down movement of the finger, or another object.**

In applications wherein the movement of a human finger in the Z direction and the input device relative to each other is **used to perform a click function, it suffices to detect that such a movement takes place**. An accurate measuring of the displacement of the object is not necessary so that the Z-measurement may be rather rough. Even the direction of the movement need not be detected.⁴

Importantly, this portion of Liess et al. highlights the differences between determining distances and movements in the X and Y directions and determining the slight movement associated with a “click function” in the Z direction. Liess et al. teach that the distance of the movement in the X and Y directions is more reliable and accurate because they are the result of averaging the X and Y signals and because subtracting the output signals from one another eliminates the influence of unwanted movement errors. In contrast, the signal for the Z direction is obtained by adding, not subtracting signals, and therefore yields a displacement value that is rather rough and cannot even ascertain the direction of movement. Clearly, Liess et al. see that such determinations are two very different things.

The Office states that Liess et al. “still [need] to determine or measure the distance in the Z direction between the device and the tracking surface in order to determine whether a click function is performed by the user.” But a fair reading of the portion of Liess et al. reproduced above contradicts this interpretation. Liess et al. state that for a click function, “it suffices to detect that such a movement takes place.” Mere detection of a movement is much different than

determining the relative distance between the device and the tracking surface. In fact, Liess et al. teach away from Applicants' invention by teaching that accurate measurement in the Z direction is not necessary, as "it suffices to detect that such a movement takes place." One skilled in the art reviewing the disclosure of Liess et al. would not be motivated to provide a controller for **determining the relative distance** between a device and a tracking surface, as Liess et al. clearly do not teach or suggest such a determination of distance. In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1. Claims 2-17, which depend directly or indirectly from claim 1, are submitted as patentable for the same reasons as set forth above with respect to claim 1.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 38

Reconsideration of the rejection of claim 38 under 35 U.S.C. § 102(c) as being anticipated by Liess et al. is respectfully requested.

Claim 38 is directed to a data input device for use with a tracking surface comprising:

a single laser having a cavity from which a light beam is projected, said laser being configured to project the light beam onto said tracking surface, at least a portion of the light beam striking said tracking surface reflecting back into the cavity of said laser and thereby altering at least one characteristic of the projected light beam;

a detector associated with the laser for detecting said at least one altered characteristic of the light beam projected by the laser; and

a controller responsive to the detector for operating the device in a tracking mode or a non-tracking mode depending upon said at least one altered characteristic of the projected light beam.⁵

Here, the controller responsive to the detector operates the device in a tracking mode or a non-tracking mode depending upon the altered characteristic of the projected light beam. This switch in operation between the tracking mode and the non-tracking mode allows the user to "clutch" the device, or move the device and tracking surface with respect to one another without recording any tracking movement (such as when a mouse is picked up). Without disclosing such a controller for operating in these two modes, Liess et al. cannot anticipate amended claim 38.

⁴ Id. at column 12, lines 36-56 (emphasis added).

⁵ (emphasis added).

To anticipate a claim, each and every element of the claim must be found, either expressly or inherently described, in a single prior art reference.⁶ Without teaching each element, Liess et al. cannot anticipate amended claim 38. Here, Liess et al. fail to teach operation in a tracking mode or a non-tracking mode. The Office's reference to "operating the device in a tracking mode (cursor movement) or a non-tracking mode (click mode)"⁷ is not the same as the claimed modes of operation. The click function described in Liess et al. related to the use of the components of tracking for click detection, in addition to scrolling. For example, while scrolling or when not scrolling, the user may move in the z-direction and Liess et al. will consider the movement an indication of a click, such as of a mouse button or touch pad. There is no discussion of suspension of tracking according to Liess et al. Rather, it is clear that scrolling may continue while clicking occurs. If these functions can occur simultaneously, then clearly **there is no suspension of tracking due to clicking**. Moreover, the clicking function and scrolling function are independent, such that one or both may occur. In other words, according to the teaching of Liess et al., activating the clicking function does not alter the scrolling function.

Thus, Liess et al. provide no teaching for suspension of tracking based upon an altered characteristic of the light beam. It is unclear how Liess et al. contemplate performing such a clutching function. The Office states that such clutching occurs "if [a] user's finger is moved far away from the input device so the detector does not detect sufficient light reflected from the finger." But the Office has not provided, and Applicants cannot find, an express or implied teaching of how the device of Liess et al. will function in such a scenario. Without a clear teaching in Liess et al., it is just as likely that when the finger is moved far away the controller will continue to track in the last known direction, will track to the nearest selection element on the user interface, or any number of other possibilities. Without a clear teaching based upon Liess et al. itself, we cannot assume that Liess et al. will provide the functionality claimed by Applicants.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 38. Claims 39 and 40, which depend directly from claim 38, are submitted as patentable for the same reasons as set forth above with respect to claim 38.

⁶ M.P.E.P. § 2131.

⁷ August 8, 2006 Office action, page 5, lines 7-9.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim Rejections under 35 U.S.C. § 103(a)

Claim 26

Reconsideration of the rejection of claim 26 under 35 U.S.C. § 103(a) as being unpatentable over Liess et al. in view of U.S. Patent No. 4,477,890 (Mooney et al.) is respectfully requested.

Claim 26 is directed to a method comprising:

- projecting a light beam onto a tracking surface from a laser having a laser cavity, wherein a data input device includes said laser and laser cavity;
- receiving at least a portion of the light reflected by the tracking surface within the laser cavity;
- mixing said received reflected light with light generated within said laser cavity, said mixing thereby altering at least one characteristic of said projected light beam;
- projecting a light beam with said at least one altered characteristic from said laser cavity;
- detecting said at least one altered characteristic of the light beam, **wherein the projected light beam is reflected from a reference surface acting as a field stop for limiting direct detection of light reflected from the tracking surface prior to said detecting;** and
- determining the relative distance between said device and said tracking surface as a function of the at least one altered characteristic of the projected light beam.⁸

Here, the addition of a reflection from a reference surface for limiting detection of light directly reflected from the tracking surface provides the benefits discussed by Applicants in the application. According to this method, the light beam detected is reflected from the reference surface, and any light reflected by the tracking surface is not detected. The reference surface acts as a field stop, limiting light from directly reflecting from the tracking surface to the detector. Detecting only light reflected by the reference surface helps minimize any noise or signal aberrations introduced by features of the tracking surface. In other words, without reflection by a reference surface, reflected light from the tracking surface or ambient light reflected between the device and the tracking surface can reach the detector, thereby increasing the noise in

⁸ (emphasis added).

detected signals. With reflection by a reference surface, however, the noise or signal aberrations introduced by the tracking surface are minimized. Without a teaching for such reflecting from a reference surface, Liess et al. cannot anticipate amended claim 26.

In the present action, the Office has introduced Mooney et al. for teaching such a claimed reference surface. But Mooney et al. fail to teach or suggest this claimed element, and therefore the Office has failed to set forth a *prima facie* case. In particular, claim 26 requires that the reference surface act as a field stop for **limiting direct detection of light reflected from the tracking surface**. In other words, the reference surface must not allow detection of light **directly** from the tracking surface, thereby minimizing noise or signal aberrations introduced by the tracking surface. Mooney et al. disclose a field stop 32 with a small aperture for limiting the amount of light striking the photodetector 38, but the field stop clearly allows light to **directly** strike the photodetector from the glass master 16, or tracking surface. This teaching does not show the feature of claim 26, which requires that the field stop limit **direct** detection of light reflected from the tracking surface. In Mooney et al., the diagram of Fig. 2 clearly shows that light travels **directly** from the glass master 16, or tracking surface, to the photodetector 38 through the small aperture of the field stop. Because the Office has not provided a reference that teaches each and every element of the claim, the Office's has failed to establish a *prima facie* case with respect to claim 26.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 26. Claims 27 and 28, which depend directly or indirectly from claim 26, are submitted as patentable for the same reasons as set forth above with respect to claim 26.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 33

Reconsideration of the rejection of claim 33 under 35 U.S.C. § 103(a) as being unpatentable over Liess et al. is respectfully requested.

Claim 33 is directed to a method comprising comparing relative distance between the device and the tracking surface to a lift-off detection distance and altering the data output of the data input device as a function of the comparison. The Office explicitly admits that Liess et al. provide no such comparison. The Office then states that Liess et al. do teach "measuring a Z

direction movement of the human finger and the tracking surface”⁹ But as discussed with respect to claim 1, Liess et al. provide no such teaching for measurement. The portion of the Liess et al. reference cited by the Office pertains to velocity detection, not measurement. Moreover, in other portions of the disclosure, Liess et al. specifically teach that quantifying such movement is “not necessary” (see excerpted portions above with respect to claim 1). With such an explicit teaching to the contrary, the Office cannot bend the clear teaching of Liess et al. back toward Applicants’ claimed invention.

As stated previously, the Office fails to set forth a *prima facie* case, so Applicants remain under no obligation to submit evidence of nonobviousness. In particular, the Office fails to demonstrate that Liess et al. provide some suggestion or motivation to modify Liess et al. Here, the teaching is quite the opposite. Liess et al. suggests that the modifications toward Applicants’ claimed invention would not be advisable or necessary. Such a teaching cannot be ignored by the Office in making an obviousness rejection. Furthermore, Liess et al. does not teach all of the claim limitations of claim 33. Liess et al. teach neither the comparison of claim 33 nor the altering the data output as a function of the comparison. These omissions are significant. Without satisfying each prong of the *prima facie* case, the Office’s rejection is improper.

The Office’s comments in the most recent Office action do not remedy the previous failure to set forth the elements of a *prima facie* case of obviousness. The Office states that “it would have been obvious to a skilled artisan to realize that the relative distance must be determined (measured) and compared with the effective range in order to know if the finger is within or outside the effective range.”¹⁰ The Office fails to address Applicants’ argument regarding the motivation in Liess et al. for such a modification. Moreover, the Office fails to point to a teaching in Liess et al. for **comparing** with an effective range. It is likely that a device functioning in accordance with the Liess et al. disclosure would not perform such a comparison, as a comparison is not necessary to detect a click, and is not advisable, given the “rather rough” measurement described in Liess et al. and discussed above.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 33. Claims 34-37, which depend directly or indirectly from claim 33, are submitted as patentable for the same reasons as set forth above with respect to claim 33.

⁹ *Id.* at page 5, lines 5-6.

¹⁰ December 12, 2006 Office action, page 8, lines 14-18.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

Claim 18

Reconsideration of the rejection of claim 18 under 35 U.S.C. § 103(a) as being unpatentable over Liess et al. in view of Kinrot (U.S. Patent No. 6,741,335 B2) et al. is respectfully requested.

Claim 18 discloses a data input device comprising a controller responsive to the detector for **determining the relative distance between said device and said tracking surface** as a function of the altered characteristic of the projected light beam detected by the detector. This feature is the same feature discussed above with respect to the anticipation rejection of claim 1. Here, the standard is obviousness, but the rejection fails for the same and additional reasons.

First, neither Liess et al. nor Kinrot et al. teach each of the claim elements. In particular, as discussed with respect to claim 1, Liess et al. fails to disclose a controller responsive to the detector for **determining the relative distance between said device and said tracking surface** as a function of the altered characteristic of the projected light beam detected by the detector. Applicants do not believe that Kinrot et al. teach this element, and the Office cites Kinrot et al. for an entirely different teaching. Thus, neither cited reference teaches this element.

Second, neither reference provides a motivation or suggestion to combine, and as abundantly discussed above, Liess et al. teaches away from any such combination when it teaches that determination of any such relative distance is unnecessary. The present action provides no additional argumentation with respect to claim 18, and relies upon the Office's arguments with respect to the anticipation of claim 1.

In view of the foregoing, Applicants respectfully request reconsideration and withdrawal of the rejection of claim 18. Claims 19-23, which depend directly or indirectly from claim 18, are submitted as patentable for the same reasons as set forth above with respect to claim 18.

If the Office maintains the rejection of the present claim, Applicants request the courtesy of a phone call to the undersigned at (314) 231-5400.

CONCLUSION

In view of the foregoing, favorable reconsideration and allowance of this application is requested.

The Applicants wish to expedite prosecution of this application. If the Examiner deems the claims not in condition for allowance, the Examiner is invited and encouraged to telephone the undersigned to discuss making an Examiner's amendment to place the claims in condition for allowance.

Applicants do not believe that a fee is due. But if the Commissioner determines otherwise, he is authorized to charge Deposit Account No. 19-1345.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "B. Klein", with a stylized flourish at the end.

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